CEREAL SCIENCE today

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JULY 1961 • VOL. 6 • NO. 6 • 60C

ASSOCIATION OF CEREAL CHEMISTS

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LETTERS to the editor

DEAR SIR:

I should like to thank you, your staff, and the members of the American Association of Cereal Chemists for the article, "Civil Defense Training Can Save Lives and Property in Time of Natural Disasters." *(Cereal Science Today 6:* 130 (April 1961).)

On October 9, 1959, I addressed the Tri-Section Meeting of the AACC at Manhattan, Kansas. The subject of my talk was the importance of the cereal chemist and the vital role he would be called upon to perform in the event of a nuclear attack. The subject article indicates that AACC members are willing to assume this vital responsibility which would assist State Civil Defense authorities to realistically plan for continuity of processing cereals into food and feed products. Many persons of high I.Q. must be properly trained in order that they may instruct and assist functioning employees who would be involved in operating cereal food and feed plants to recognize various kinds of contamination and evaluate varying degrees of fallout intensity or other dangers that may confront those responsible for plant operation. In my opinion, there is no better qualified group to take on this supervisory responsibility than cereal chemists. It is reasonable to assume that a greater efficiency of production continuity might be obtained as a result of the subject training your members have expressed a willingness to undertake.

It is sincerely hoped that each State Civil Defense authority will recognize the importance of your members' willingness to undertake this training and avail themselves of the potential that is thereby made possible.

PHILIP TALBOTT
Executive Secretary
Grain Defense
Planning Committee

Commodity Stabilization Service
Grain Division, U.S.D.A.
Washington, D.C.

EDITOR'S NOTE: More than 100 persons from 21 states attended the 1½-day training course in preparedness planning, presented by the Civil Defense Branch, FDA, just after the AACC's annual meeting in Dallas, Texas, April 1961. In attendance were representatives from 55 food manufacturing firms. Program subjects included sabotage and espionage; how the enemy might introduce radiological, chemical, and biological agents into a food-processing firm's production; and methods that firms might use to protect themselves.

The Civil Defense Branch, FDA, plans to give similar courses to other branches of the food processing industry. The one given in Dallas placed emphasis on the vulnerability of the milling industry to attack; others will be designed specifically to the particular industry concerned.

There is no registration fee for these planning courses. Anyone interested in planning for survival and desiring more information on the needs of their particular processing problems should contact Homer J. McConnell, Director, Civil Defense Training Program, Civil Defense Branch, Bureau of Program Planning and Appraisal, Food & Drug Administration, Washington, D.C.

PURPOSE

The American Association of Cereal Chemists is devoted to: 1) the encouragement of scientific and technical research on cereal grains and their products; 2) the study of development and standardization of analytical methods used in cereal chemistry; 3) the promotion of the spirit of scientific cooperation among all workers in the field of cereal chemistry; 4) the maintenance of high professional standards of its membership; and 5) the encouragement of a general recognition of the value of the chemist and biologist to the cereal industries.

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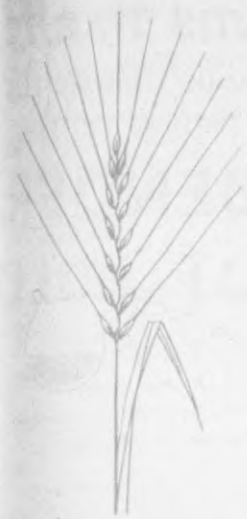
MEMBERSHIP

Membership in the AACC is open to professionally qualified individuals anywhere in the world. Corporate memberships are available for those companies wishing to lend industry support to the scientific work of the Association. An application form for membership may be obtained by writing the American Association of Cereal Chemists, 1955 University Avenue, St. Paul 4, Minnesota.



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COVER: CEREAL CHEMISTRY'S new Editor, Dr. K. A. Gilles, at his desk in the Department of Cereal Technology, North Dakota State University, Fargo.

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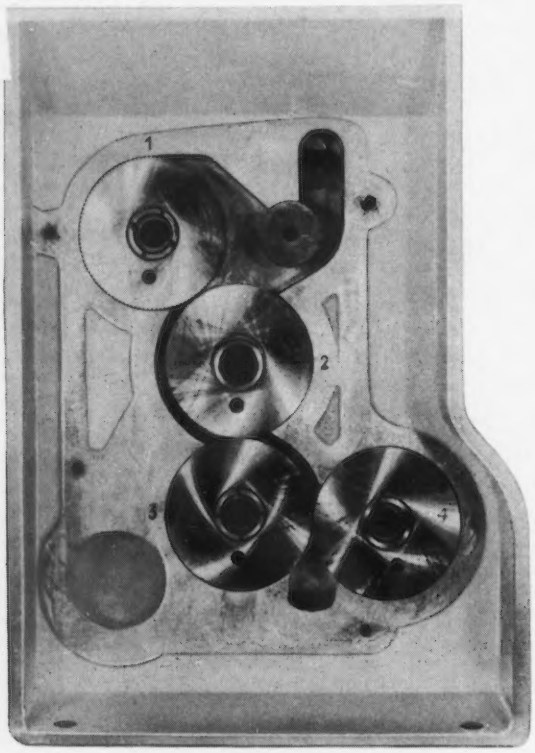

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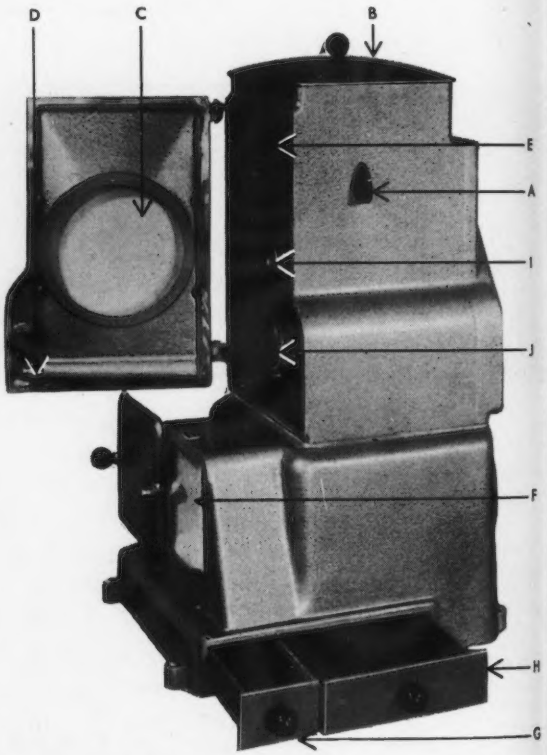

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editorial

Another year's harvest of cereal grains has begun. As it progresses from one crop to another and from south to north, some of the important changes in agricultural practices are readily apparent to the casual observer. Mechanization has made it possible for a smaller labor force working on larger farm units to meet the food requirements of an expanding population.

Equally important, but outwardly less noticeable, are the changes brought about by chemists' contributions to the development of improved crop varieties, control of pests and disease, better cultural practices, reduced storage losses, more efficient processing methods, and food products that provide an unsurpassed combination of palatability, nutritional value, and convenience.

The end is not in sight. A growing understanding of the chemical mechanisms of heredity promises new vistas for the plant breeder. Chemical controls may supplant the need for developing disease-resistant plant varieties. Changing conditions may make feasible the application of knowledge previously thought to be without practical value.

Some will decry all of these advancements as progress in the wrong direction. For the most part, their concern will arise out of ignorance rather than knowledge. To avoid having their efforts and accomplishments misunderstood by their fellow men, chemists have an obligation to devote a share of those efforts to explaining their work and the need for it to others. The health, well-being, and goodwill of consumers are paramount. No real advancement can be claimed except as these are protected.

P.E.R.

THE ACCEPTABILITY OF many food products, the type of packaging and handling that they require, and the processing steps involved in preparation may be largely determined by a food's stability toward oxidative changes in its lipid components.

The development of rancidity is an insidious phenomenon, since it takes place during a period of varying length in which no change is readily detectable. Stability is normally measured in terms of the length of this induction period. When this period has been passed, fats are rapidly oxidized at their points of unsaturation and hydroperoxides are formed. Soon these peroxides break down and form short-chain volatile carbonyl compounds that are responsible for the characteristic odor of rancid fats.

Experience has provided a great deal of empirical knowledge concerning products which are most likely to become rancid and the conditions which favor or retard oxidative changes. Polyunsaturated fatty acids are more readily oxidized than the more saturated; free fatty acids are somewhat more so than the same FA in a triglyceride molecule. Elevated temperatures speed up fat oxidation. Trace amounts of some substances may greatly affect the rate of fat oxidation, with some functioning as prooxidants and others as antioxidants.

Stability tests on cereal products by the

Oxygen Bomb Method

By J. F. Wintermantel, D. J. New,[1] and P. E. Ramstad

Products Control Department, General Mills, Inc., Minneapolis, Minnesota

Tests in General Use

The presence of rancid fat is usually detected readily by smelling or tasting the product in question, and chemical tests for the presence of peroxides or carbonyl compounds may be used to confirm organoleptic evidence. However, it is more frequently of interest to predict the stability characteristics of a food, and it is especially desirable to be able to ascertain the effect of changes in processing or formulation. One way to do this is simply to store the product under various conditions and examine it at intervals to find the time required before rancidity is evident. Such tests are frequently employed, and they are very useful. Their obvious drawback is the length of time required.

For many years the Swift test or Active Oxygen Method (AOM) has been widely used as a means of finding and comparing the stability characteristics of shortenings. The advantage of this procedure is that time required is measured in hours rather than months or years. Its disadvantage is that it is adaptable only to products that are liquid at the temperature employed for the test. The Schaal oven test is suitable for a wider variety of foods, including many cereal products. The time it requires varies widely; on some foods, it may be several weeks. All of these tests give us measurements in terms of measurable peroxide formation or detectable carbonyl compounds.

Another approach is simply to measure oxygen absorption. Eckey (2) described such a method for determining the stability characteristics of edible fats in 1946. The petroleum industry uses this principle to measure the stability of gasoline toward gum formation. Standard ASTM equipment has been designed and is generally used in the petroleum industry for this purpose (1). Gearhart, Stuckey, and Austin (4) reported in 1957 on the application of this equipment in determining stability characteristics of edible fats.

The Oxygen Bomb Test

The operating principle of the oxygen bomb test is very simple. The sample to be tested, usually 30 g., is placed in a small, glass-lined pressure vessel. The system is flushed with oxygen several times and finally brought to an oxygen pressure of 50 lb. per sq. in. The bomb is placed in a boiling-water bath and is connected to a continuous-pressure recorder. The end point of the test is determined from the recorder chart which plots pressure against time. The end of the induction period is arbitrarily defined as the midpoint of the first hour during which the pressure drops at least 2 lb. per sq. in. As a safety measure, the system contains suitable rupture disks which will immediately release if the pressure in the system exceeds 160 lb. per sq. in.

The method has been found suitable for ascertaining the relative stability characteristics of a number of cereal products. Advantages are 1) that a complete product, such as a cereal or baking mix, may be tested rather than a single component such as the shortening, and 2) that time required for completion is normally measured in hours. Thus, the method becomes useful for evaluating the possible effect upon stability of certain changes in ingredients or processing that might be desired for one reason or another. We have found the method suitable for flours, vital wheat gluten, ready-to-eat breakfast cereals, and baking mixes. In addition we have used it, as others have reported, with fats and oils to obtain the same type of informa-

[1] Present address: Durkee Famous Foods, Division of The Glidden Co., Chicago, Ill.

tion that is provided by the Active Oxygen Method.

Table I. Effect of Bleach Treatment on Oxygen Bomb Stability of Flours

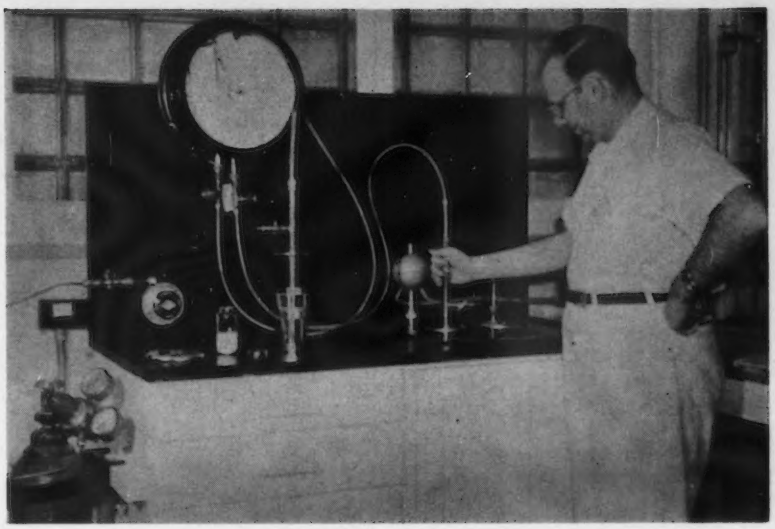
	Bomb Stability	
	No Bleach	*Bleached with ClO_2, 2 g/cwt*
	hours	*hours*
Soft wheat, straight grade	16.	5.5
Hard wheat, first clear	21.5	4.5
Hard wheat, first clear, plus 10% refined corn oil containing 0.06% Tenox-6	21.	20.

Table I shows the sort of information obtained with the method. Bleach treatments in these experiments are obviously very heavy. However, the results confirm other observations that the lipid portion of flours is affected by bleaching treatments. The quantity of oxygen absorbed by the hard-wheat clear was greater than in the soft-wheat straight-grade, as indicated by the larger pressure drop with the former. This would be expected because of the higher lipid content of the hard-wheat clear.

Carrying this line of experimentation further (Table I), 10% of refined corn oil stabilized with 0.06% Tenox-6 was added to the bleached and unbleached hard-wheat, first-clear flours. The presence of the stabilized corn oil completely overshadowed the effect of bleaching. Both samples give essentially the same results; the bleached flour reached its end point at 20 hours and the unbleached at 21 hours. The antioxidants in the corn oil actually had a stabilizing effect upon the flour lipids.

Elder (3) has described the effect of moisture upon the stability characteristics of ready-to-eat breakfast cereals. He showed that extremely low moistures favor oxidative changes, as tests with the oxygen bomb vividly demonstrate. One such product showed an induction period of 6.5 hours at 3.5% moisture. When the same sample was raised to a moisture of 6.0%, its induction period in the oxygen bomb was 21.5 hours.

The effect of moisture upon stability is again illustrated in the series of tests on vital wheat gluten; data are shown below. None of the gluten samples we tested showed the type of end point observed with most other products. For this material, the end point was arbitrarily taken as the time required for the pressure to drop 5 lb. below the pressure attained after equilibrium had been reached in the boiling-water bath. The total effect is a gradual loss of pressure rather than the sharp break that ordinarily characterizes the end of an induction period. A possible explanation for this phenomenon is that each gluten sample consists of a heterogeneous mixture of particles with varying inherent stabilities.

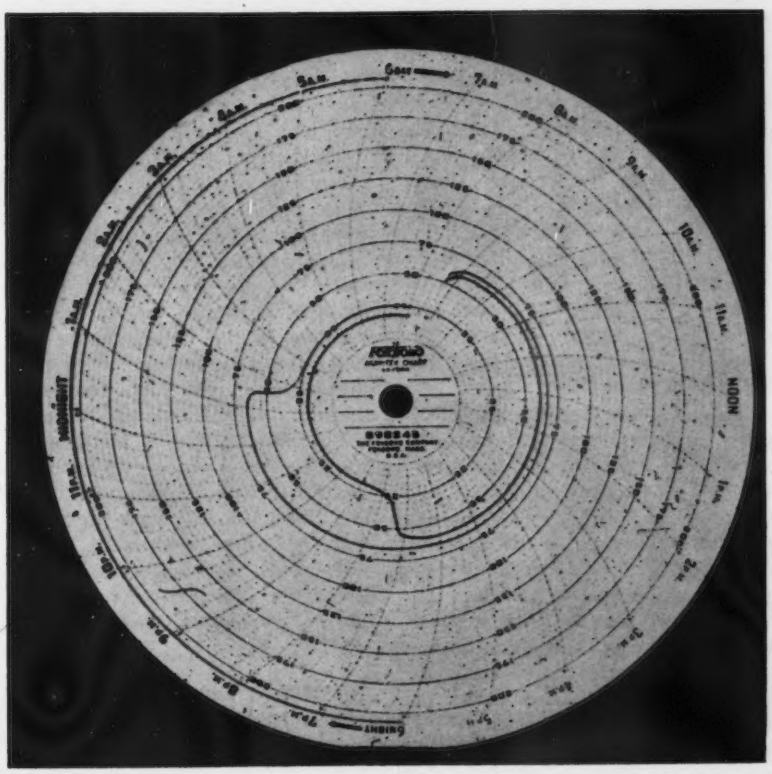


Above: The equipment. Below: A recorder chart.

Moisture Content	*Time required for 5 p.s.i. Pressure Drop*
%	*hours*
8.6	12
5.7	10
2.8	4

Mixes

Tests with baking mixes are especially interesting because a means is provided for finding the inter-



action effects of many ingredients that affect stability of such products. For example, cake mixes are readily tested by this technique, and the comparative stabilities of different formulations can be readily found. A typical yellow cake mix will exhibit an induction period of approximately 33 hours in the bomb. Although it has long been known that cocoa powder has an antioxidant effect in baking mixes, we have not known of a convenient, rapid manner of demonstrating this in the laboratory. The oxygen bomb makes this possible. Table II compares the stabilities of two types of cake mixes with those of similar mixes containing cocoa.

Table II. Effect of Cocoa on Stability of Cake Mixes

Cake Mix	*Oxygen Bomb Stability*
	hours
Type A	
Typical yellow	33
Similar, but containing cocoa	75
Type B	
Without cocoa	25
Similar, but containing cocoa	45

Surface Exposure of Package vs. Oxidation

With a fat-soaked food package there is the tremendous acceleration of oxidative rancidity that accompanies a large increase in exposed surface area of a fat. This phenomenon and its importance in food products can be readily demonstrated with the oxygen bomb. We have found that if the amount of surface exposure per unit weight of fat is held constant, the size of the sample does not affect the length of the induction period. Increasing the sample size merely amplifies the pressure drop at the end of the period.

Thus, for samples which exhibit only moderate pressure drop, it may be desirable to increase sample size as much as possible in order to get a clear-cut end point. On the other hand, if the amount of fat in the sample is held constant but the surface exposure of that fat is greatly increased, a marked decrease in induction period may be observed. This is illustrated in Table III. A sample of shortening with an 80-hour AOM stability had an induction period of 64 hours in the oxygen bomb. The induction periods were reduced when the surface exposure was increased by dispersing the fat over cellulose fibers, finely powdered calcium carbonate, and a diatomaceous earth.

Table III. Effect of Degree of Surface Exposure on the Oxygen Bomb Stability of Shortening

	hours
Active oxygen method	80
Oxygen bomb	
15 g. not dispersed	66
6 g. not dispersed	64
6 g. on one Kimpac[a]	18.5
6 g. on two Kimpacs[a]	10.5
6 g. on 18 g. $CaCO_3$	21
6 g. on 18 g. SuperCel	1.25

[a] 5 by 9 in., ⅛ in. thick.

Stuckey *et al.* (5) have suggested increasing reactivity through greater surface exposure in order to shorten the time required for comparing stabilities of fats and oils. Because of the great effect that this may have, it is believed extremely important that great care be taken to assure uniform and complete dispersal of the oil on the carrier when this technique is employed.

Pressure Safeguards

Oxygen pressures as high as 100 lb. per sq. in. are frequently used in oxygen bomb work. With products of the type investigated, no advantage could be found in the use of 100 lb. per sq. in. as compared to 50 p.s.i. Because of the safety hazard, especially with samples which oxidize rapidly, and because of the tendency to leak more readily under higher pressures, 50 p.s.i. has been used in all of the work. Because some samples may oxidize so rapidly as to literally explode in the bomb, we believe it is important to have the system protected by safety valves that automatically release pressure if it exceeds 160 p.s.i. This is a protection both for the recording equipment and for laboratory personnel. Thus far, there has not been an actual instance where the safety valves were needed, though rapid pressure rises have resulted from rapid combustion of some samples.

Summary

The oxygen bomb test has been found useful as a means of measuring and comparing the resistance of various cereal and related products to the development of oxidative rancidity. The method has been used on flours, vital gluten, ready-to-eat breakfast cereals, and baking mixes. It has previously been shown to be suitable for testing stability characteristics of fats and oils. It has the advantages of being a rapid procedure and of measuring stability characteristics of finished products as well as the ingredients that go into them. We believe the method can be of great value to cereal chemists.

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policies and methods of the Food and Drug Administration for

Fungicides on Grain[1]

By Norman E. Foster
Chief Chemist
U.S. Food and Drug Administration, Dallas District, Dallas, Texas

A NUMBER OF fungicides on the market are intended for use on seed grain to protect the seed from soil organisms. Many contain mercury, which is highly toxic to all forms of life and cumulative in its effects. Nonmercurial fungicides vary in their degree of toxicity. If grain treated with these poisons were used only for seed, there would be no need for concern by industry, the consuming public, and regulatory officials. However, unused seed grain has become mixed in with market deliveries, either accidentally or intentionally. FDA inspections have revealed a few instances of wholesome grain becoming contaminated through improper use of conveying equipment or faulty location of the treatment machine. Regardless of the cause, there is no need for these poisonous compounds to be present in food; hence, no tolerance or exemption from a tolerance has been established under the Food, Drug, and Cosmetic Act.

Under the Food, Drug, and Cosmetic Act, shipments of grain proved to contain these fungicides are adulterated. The table outlines seizures that were the result of action by the Food and Drug Administration, listed by fiscal years, July 1 to June 30. The large numbers reported for 1952-1953 occurred in Minneapolis in the summer of 1952. They were recorded when the Minneapolis District happened to locate the shipment, analyze a sample for mercury, and cause the libel suit to be filed. Several lots of corn were handled in one seizure.

Table I. Lots of Grain Seized for Adulteration by Fungicides, 1952 to 1960

Fungicide and Grain	*1952*	*1953*	*1954*	*1955*	*1956*	*1957*	*1958*	*1959*	*1960*
Mercury compounds									
Wheat	17	40	2	6	3	14	14	7	6
Oats						3	3		
Barley					3	3		1	2
Oats and barley							1		
Mixed screenings								1	
Thiram — corn		2		13	1		4		
Tetrachlorobenzoquinone (Spergon) — corn		2		1					
Totals	17	44	2	20	7	20	22	9	6

Some shipments resulted in prosecution of the shippers, but these have not been tabulated.

Program for Insects and Rodent Excreta

Hundreds of samples of wheat and some other small grains are examined annually in our Clean Grain Program, in which our primary concern is the presence of rodent excreta and insects. These samples are also examined visually for the characteristic red color used in most modern liquid treatments. This red dye is not the treatment itself, but is used by the manufacturer to mark the treatment, and to aid in preventing confusion of treated seed with untreated. The color, of course, also aids in giving some indication of the uniformity of treatment and the level present. Ultraviolet light is helpful in this examination as the dye used is fluorescent, and the orange-red color stands out prominently. If any "pink" kernels are found, they are picked out and mercury is determined chemically. The chemical determination is necessary because a red color may be present from other causes, such as the fungus *Gibberella saubinetii*.

Mercurial Fungicides

An excellent sensitive and accurate method is available for mercury (1). This consists of digesting a sample, generally about 3 g., with nitric acid and sulfuric acid under reflux in a special apparatus, to prevent the loss of the volatile mercury. Mercury and copper are extracted with dithizone, interfering copper is removed, and mercury is determined by photometric measurement of the dithizonate.

Of course, only the mercury in the "pickouts" will be determined, and any mercury which has translocated to other kernels by volatilization or rubbing will not be measured. The value can be computed to an average for the original lot by multiplying by the percent of pickouts and dividing by 100.

The foregoing method serves to confirm mercury when a color treatment has been used. However, some fungicides do not color the grain, principally those applied as a dust or slurry. The AOAC chemical procedure is costly in time and equipment and is seldom used as a screening method to detect the colorless fungicides. A modification can be used, which utilizes a sulfuric acid wash of a relatively large

[1] Presented at the 46th annual meeting, Dallas, Texas, April 1961.

sample (200 g.) followed by the AOAC dithizone extraction, and yields sufficient mercury to detect blends of the treated grain.

Bacteriological Screening Method

The screening method presently used is a bacteriological inhibition method devised by Sam Molinas of the Division of Microbiology, F.D.A., published recently in CEREAL SCIENCE TODAY (5).

Only the principles of the method will be mentioned here. This is a simple, nonspecific procedure which depends on the fact that fungicides in contact with agar will diffuse out from the surface of the grain, and will inhibit the growth of a test organism. Dr. Molinas chose *Sarcina lutea,* which is sensitive to most fungicides (not to hexachlorobenzene and pentachloronitrobenzene) and grows sufficiently in an incubation period of 12 to 18 hours.

Ordinary sterile nutrient agar, which is readily available in dehydrated form, is melted, cooled to 45°–50°C., and inoculated with 0.1 ml. of a 24-hour broth culture or saline suspension of the test organism per 20 ml. of agar. The agar is shaken and poured into Petri dishes or flat baking dishes.

Kernels of grain, preferably from a counting device, are dropped on the agar before it solidifies in order to leave kernels half-embedded. The dishes are covered and incubated overnight at 37°C. or at room temperature.

The presence of the antifungal agent is indicated by lack of growth in a circular area around the kernel, giving the kernel the appearance of having a halo. The size of this zone is dependent upon the diffusibility of the fungicide and the quantity present in the portion of the kernel in contact with the agar. Absence of the fungicide is indicated by growth of the test organism up to the kernel of grain.

One caution should be noted. Some molds produce antibiotics which also inhibit bacterial growth. In these cases the mold can usually be seen growing at the edge of the kernel; the clear zone is uneven and not as large as that caused by chemical treatment. Before legal action is taken, the identity of the fungicide is determined by chemical or chromatographic procedures.

This bacteriological screening method is also useful in measuring the removal of fungicides from grain by mechanical abrasion. Generally, these are seized lots which are being reconditioned under bond to bring them into compliance with the F.D.&C. Act.

Detection of TMTD

For corn, the principal seed treatment is thiram, also known as TMTD, the abbreviation of tetramethylthiuramdisulfide. This compound is especially toxic to poultry and its presence has brought about severe losses. The most serious poisoning affected a 75,000-bird flock at Anoka, Minnesota, in 1954 (6).

If sufficient TMTD is present in poultry rations (around 100 p.p.m.) the few eggs laid will have no shells on them. If smaller amounts are present (around 10 p.p.m.) there will be a drop in egg production and some eggs are misshapen.

The bacteriological screening method can be used for TMTD, although in this case a chemical method is faster and easier. It involves extraction with chloroform, clarification if necessary, and production of a brown color with solid cuprous iodide. The method is now official (2) and useful notes have been published (3,4).

While no tolerances have been set up for these compounds, all chemists realize that there is a limit to the sensitivity of all methods, and trace quantities below this level could not be the basis for legal action.

Procedure for Seized Grain

It is not the place here to discuss the seizure provisions of the FDC Act; however, one phase should be mentioned since technical people sometimes must participate in the decision on what to do with seized grain. The F&DA has agreed to the following procedures for bringing seized grain into compliance with the law.

1. The grain can be completely treated, the treatment including a marking color, and it is then released for seed use.

2. The grain can be used for nonfood purposes, such as wallpaper paste or foundry flour, or for production of alcohol.

3. The grain can be treated by any process which removes the fungicide. For oats and barley, removal of the outer husks usually accomplishes this. For wheat, a severe dry scouring is necessary, but the operation has been repeatedly successful. There is an art to this, and companies properly regard their technique as a trade secret.

For corn treated with thiram, wet washing in suitable equipment will remove the treatment.

The chemical and bacteriological methods outlined in this paper are also used to ascertain the effectiveness of removal.

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Research progress and world needs are reviewed in U.S.D.A.'s Western Regional

Rice Conference

DEVELOPMENT OF RICE food products for both export and domestic markets, basic research on rice components and processing characteristics, industrial uses, and the role of rice in world nutrition received major attention at the Second Rice Utilization Conference held May 18-19 under the joint sponsorship of USDA's Western and Southern Utilization Research and Development Divisions. The conference was held at the Western Regional Research Laboratory, Albany, Calif.

Research Needs

K. K. Keneaster, chairman of the industrial Committee for Advancement of Rice Research, stressed several needs: periodic review of research findings for practical use by industry, continued basic research on composition, flavor, and other properties, improvements in milling, objective measurements of quality, and further research on uses for hulls. He also mentioned rice protein supplements, rice products for the paper, plastics, and related industries, and improvement in rice-enrichment methods as other areas where research is needed.

World Use

C. Hunnikin, representing UNICEF, called attention to the prominent part rice plays in world-wide nutrition. As a major exporter of rice, the United States has a direct interest in UNICEF's encouragement of the development of rice products and supplements (especially protein) for use in child feeding.

John R. Matchett of USDA reviewed progress in an interagency project to determine world market preferences in rice. Part I of this study, which compares markets on the basis of U.S. grades, has been published. Part II will report descriptive data on 600 samples obtained from world-wide areas. These data include kernel size, shape, and color, gelation temperature, water uptake and sedimentation at various temperatures, cooking quality, and analytical data on lipids, protein, moisture, fiber, ash, amylose and other starch fractions, and iodine value. The Foreign Agricultural Service of USDA is conducting this project with assistance from Agricultural Research Service and Agricultural Marketing Service laboratories in New Orleans, La., Beaumont, Texas, Albany, Calif., and Beltsville, Md.

Technical Progress

V. Kelly of Gerber Products Co. said that gelatinization temperature of rice starch granules is critical in baby food manufacture and is affected by variety, particle size, and free fatty acid level. The stability of baby foods containing rice flour is related to amylose content. An advantage of rice in baby food, he said, is its low allergenicity.

Virginia R. Williams of Louisiana State University and D. F. Houston of WRRL, Albany, Calif., reported progress in studies on rice proteins. The objectives include further understanding of individual components in the total rice protein and their variability as related to variety, environmental factors, and properties of the different rices.

C. R. Adair of USDA's Crops Research Division said that food qualities used as objectives in breeding programs include amylose content, gelatinization temperature, pasting characteristics, the splitting of cooked kernels when soaked, and a parboiling test for suitability for canning.

H. J. Deobald of USDA's Southern Regional Research Laboratory in New Orleans described progress in "glow discharge" studies in which rice is exposed to an electrical discharge under vacuum.

E. B. Kester of WRRL reviewed progress in a comprehensive investigation of culture and environmental variables on processing qualities. Properties measured include water uptake, paste viscosity, milling yields, color components, kernel weight, and chemical analyses.

C. L. Brooke of Merck & Co. discussed rice enrichment and also read a paper by E. J. Lease of Clemson College, South Carolina. Enrichment is complicated by the fact that coated rice (coated with talc and glucose to improve appearance) cannot be enriched under present Federal standards, except for the Puerto Rican trade. Efforts to modify these standards are now under way.

Improved drying methods for rough rice developed at the Albany laboratory are now being applied by the Southern division in commercial mills with co-operation of owners. J. J. Spadaro reported results of these trials, which thus far are encouraging. T. Wasserman of WRRL reported studies on relationship of moisture content to milling yields. D. K. Mecham discussed studies in the Albany laboratory on parboiling of Calrose rice. Optimal soaking and steam cooking conditions have been determined.

J. W. Pence and R. E. Ferrel of WRRL reviewed studies on various expanded rice food products, which show that rice is capable of being processed into a wide range of forms for special food purposes. Examples are canned instant foods, dry wafers for civilian shelters or camping, and other prepared foods.

The development of air-classification milling, discussed by G. O. Kohler, of WRRL, promises new types of rice products, some with

(Please turn to page 202)

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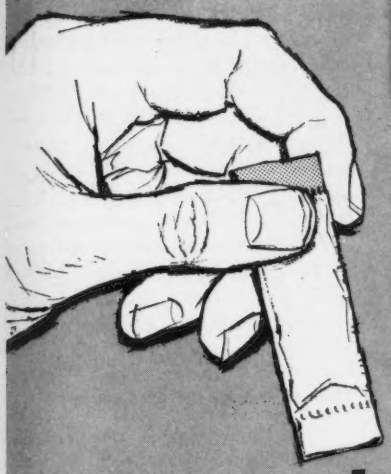

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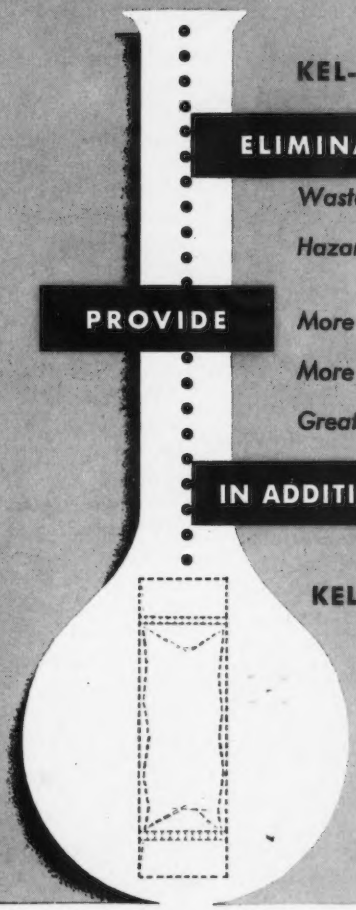

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about its scope and value,
and the short course
at Texas A&M College

Feed Microscopy in Quality Control

By E. E. Brown

Research Microscopist
Texas Agricultural Experiment Station, College Station

Feed microscopy is an analytical science used in the identification of feed ingredients by microscopic examination of the structure of their tissues and cell contents. It is primarily concerned with histological or microscopic characteristics of individual plant and animal tissues. It is a valuable tool by itself, but it also provides a valuable complement to chemical analysis. It should have a prominent place in feed manufacture and control because it is an economic and efficient tool in a quality control program.

Each tissue has certain characteristics which are peculiar to itself and occur in no other tissue. By identification of these characteristics, the presence of individual ingredients in a mixed feed can be determined. By suitable refinements of microscopic technique, the percentage of the particular ingredient in a mixture can be determined accurately. The same procedure may be used to determine whether a claimed ingredient has been omitted from the feed.

Detection Where Chemical Analysis Fails

Detection of adulteration or substitution of a claimed ingredient by a different ingredient in whole or in part, or omission of a declared ingredient often can be determined only by microscopic examination of a mixed feed. The chemical composition of an ingredient used in substitution or adulteration may be quite similar to that in the declared ingredient; however, there may be highly significant differences in capacity to produce marketable livestock products. In such a case, the chemical analysis does not indicate adulteration or substitution in the mixed feed; the only way in which substitution or adulteration can be determined is through microscopic procedures.

Adequate microscopic analysis will yield much additional valuable information. The presence of filth, immature grain, ingredients damaged by fire, overcooking, heating, water, mold, or insects, and various other factors which influence feeding quality can be determined. Information along these lines cannot be derived from the chemical analysis, but is instantly apparent upon adequate microscopic examination. Only a microscopic examination can detect the presence of many poisonous or deleterious materials —various toxic weeds, weed seeds (castor bean, crotalaria, corn cockle, darnel, mustards, and others), and poisonous fungi or molds, such as ergot.

Value of a Good Program

Feed microscopy can be of great value in detecting the presence of improper materials in ingredients before they are incorporated into mixed feeds or fed to livestock. This includes not only the sudden dramatic occurrences of poisoning, but also dietary inadequacies which reduce production. A good microscopy program has a deterrent effect on suppliers who might sell ingredients of low quality, were it not for the danger of being found guilty of fraud. Microscopy procedures can often effect a substantial saving of time, money, and manpower in mixing a feed by showing quickly, cheaply, and easily just where problem areas may occur.

The Microscopy Short Course

Because we at the Agricultural and Mechanical College of Texas believe that microscopy plays a very important part in the manufacture and legal control of mixed feeds, we have developed a short course in feed microscopy. Representatives of feed manufacturers and processors, state and federal regulatory services, and any others who might be interested in learning more about this important tool in quality control of mixed feeds are eligible for attendance. The first course, held in August of 1957, met with such success that it has been repeated in August of each year since. The next will be held August 7 to 12, 1961.

This course is directed by E. E. Brown, research microscopist. For the last two years he has been assisted by Lewis Barefield, Arkansas State Plant Board, Little Rock, and G. M. Barnhart, Missouri State Department of Agriculture, Jefferson City. Barefield and Barnhart instruct the beginner section and Brown instructs advanced students in microquantitative analysis, which includes methods for qualitative and quantitative determinations of finely ground ingredients in complex feed mixtures. Work in both sections is planned so that the course can be completed in one week.

The Curriculum

Most of the time is spent in examining basic ingredients commonly found in mixed feeds. Attention is concentrated on teaching microtechniques and demonstrating the principal distinctive histological structures found in a few basic ingredients, rather than in

(Please turn to page 202)

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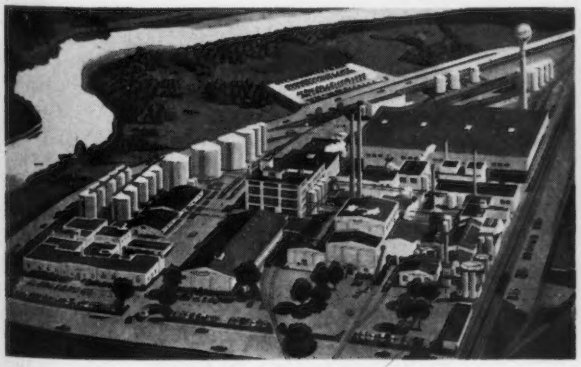

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People, Products, Patter

• • • People

Fred Atkinson died suddenly on Sunday, May 7, at age 47, while taking a short vacation at Miami, Florida. For many years he headed the Atkinson Milling Co. of Minneapolis, Minn., a family milling concern which he joined in 1935. He served since 1941 either as president or board chairman and was active in operative phases of flour milling, pioneering in bulk storage of flour. He recently was re-elected second vice president of the Millers' National Federation.

Richard C. Bradford named manager of new Pillsbury Co. flour mill at East Los Angeles, from manager of Sacramento mill. He is succeeded at Sacramento by **Henry J. Iwinski,** formerly assistant milling superintendent at Buffalo (N.Y.) flour mill.

Helmut C. Diehl named 1961 Nicholas Appert Award Medalist by the Institute of Food Technologists at its 21st annual meeting in New York, May 9. Dr. Diehl is a pioneer research scientist and administrator in frozen foods. The Award consists of a bronze medal and an honorarium of $1,000.

Edward I. Feigon appointed to new position, manager of new product development for Dole Corp.; from vp-research and development for Kitchen Arts Foods, Inc., Chicago. He will be located at Dole's San Jose (Calif.) offices, in charge of laboratory and technical development, planning, and market research in new products.

Harry Gehman elected a member of Ashland College Board of Trustees, Ashland, Ohio. Dr. Gehman is Director of research for Corn Products Co.

Thomas Hollingshead Independent Biscuit Mfg. Co., Chicago, died recently.

Sven Hagberg's unexpected death on February 28, at age 67, ended a life of arduous activity in the field of cereal science.

Graduating as a civil engineer in chemistry in 1916, he continued his studies in several countries and had a fellowship at the Boston Institute of Technology in 1921. After studying cereal chemistry, then a very young science, with Professor Neumann in Berlin he was occupied in the Swedish milling industry. From 1944 until his death he was head of the cereals and nutrition department of the Swedish Technological Institute.

Mr. Hagberg's travels led to personal friendships with leading cereal chemists in many countries and an unusually broad view in research fields. As an AACC member he visited its conventions when other activities would permit. He was a frequent speaker at Scandinavian, European, and international conventions and has published in many scientific journals, including those of the AACC.

Mr. Hagberg worked on many aspects of cereal research, such as proteins, gums, fermentation, and dough rheology. Perhaps his greatest interest was in the evaluation of sprouted wheat and rye, and he invented several methods and instruments for measuring alpha-amylase activity. His latest method, one of unusual simplicity and reproducibility, is being tested for standardization by the International Association for Cereal Chemistry. There is good prospect that the work can be completed according to plans.

A foundation in Mr. Hagberg's memory is being established by Swedish institutions and bakers.

John M. Jackson, of research division of American Can Co., Barrington, Ill., elected president-elect of Institute of Food Technologists. Dr. Jackson has served in various capacities in Research and Development Associates, Quartermaster Food & Container Institute, including vp in charge of activities committee.

Maynard Joslyn named 1961 International Awardee, for outstanding efforts in promoting the international exchange of ideas. The award (annual) consists of a silver salver.

Theodore P. Labuza, student at M.I.T., receives Dodge & Olcott's annual scholarship award of $1,000. The award was established several years ago under the auspices of the I.F.T. and is designed to encourage deserving and outstanding students to take undergraduate work leading to a bachelor's degree in food technology, food engineering, or food science.

Don Lilly, assistant chemist for General Mills, transferred from Spokane laboratory to Los Angeles, to work under **Joe De Haan.**

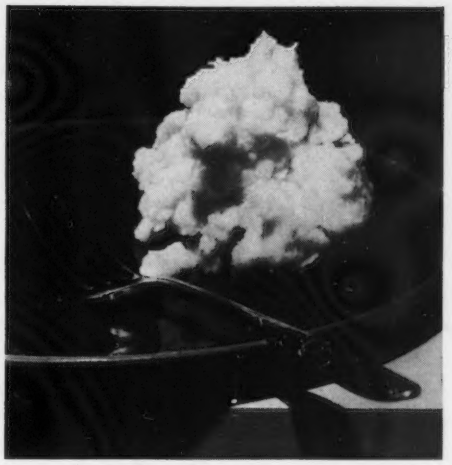
Daniel Melnick named director of research, Corn Products Co., in charge of Bayonne (N.J.) and associated laboratories. Other appointments: **Chester M. Gooding,** assistant director of research; **Frederick H. Luckmann,** chief technologist; **James D. Miller,** chief control chemist; **William V. Magee,** to head Bayonne Laboratory quality control group.

Nat H. Nash appointed director, new products development and marketing, Basic Foods, Inc., manufacturer of icing bases, machines, and bakery ingredients; in 20 years with food industry, has specialized as chemist, technologist, service man, and consultant in bakery and dairy fields.

P. F. Pelshenke, director of the West German Federal Research Institute for Cereal Chemistry, addressed the 65th annual international conference, Association of Operative Millers, in Minneapolis, during May.

Textures for sale

In fat-based foods *Myverol® Distilled Monoglycerides* are widely recognized for one group of effects. In shortening, for example, they so control the tricky relationship between batter "curdle," bubble size, and cell-wall strength that a wonderful cake texture comes out of the oven. They permit peanut butter to go to the beach on a July day without leaking oil, yet spread smoothly after a week in the refrigerator.



In starch-based foods *Myverol Distilled Monoglycerides* have won just as big a place for an entirely different effect—the complexing of dissolved amylose. Dehydrated potato products have enjoyed their rip-roaring success because they make up into a food that looks like, tastes like, and *is* mashed potato, not library paste. Hot cereals no longer need inevitably turn jellylike a certain time after cooking.

A very small content of these unique molecularly distilled monoglycerides profoundly affects the delicate architecture of foods. Prepared from the glycerolysis of edible fats or oils, *Myverol Distilled Monoglycerides* are exempt from the Food Additives Amendment. For technical data and prices write ***Distillation Products Industries,*** Rochester 3, N. Y. Sales offices: New York and Chicago • W. M. Gillies, Inc., West Coast • Charles Albert Smith Limited, Montreal and Toronto.

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Dudley J. Russell elected to presidency of Atkinson Milling Co., succeeding Frederick M. Atkinson. Other new appointments in the company: **Dennis B. Schact,** treasurer; **E. C. Danielson,** secretary; **E. D. Rogers, Jr., Logan P. Johnson,** and **Thomas J. Whalen,** vice-presidents; **William Mitchell,** chairman of board.

Hans W. Vahlteich retired May 1st from vp research and quality control, Best Foods Div., Corn Products Co., after 37 years of service with these firms. He made notable contributions to development of food products, particularly in oil and margarine field.

H. Horace Ward, well-known British cereal chemist and owner of Aynsome Laboratories, Grange-over-Sands, died on March 3, at age 74. He had held appointments as County Official Agricultural Analyst for several counties, over many years and continuously until the time of his death. From 1940 he was Official Analyst for the National Association of Corn and Agricultural Merchants. He acquired the Aynsome Laboratories in 1921 and built up the business in succeeding years. Much of his time was devoted to discussing and unraveling the problems of flour and feed millers.

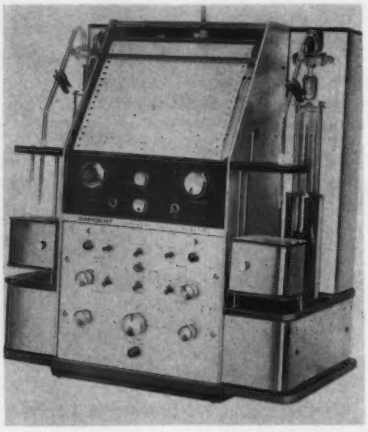
Harold Webber of London, England; **Niels Chr. Moller** of Copenhagen, Denmark; and **Yoshiro Kuroiwa** of Tokyo, Japan, were visitors to the A.S.B.C. convention in San Antonio, Texas, in early May. Dr. Kuroiwa presented a paper on the chemical composition of sunstruck flavor substance of beer.

• • • Products

Aluminum spouting in pilot flour mill. Reynolds Metals Co. points out the advantages of aluminum for flour spouting, as used in the new model flour mill at Kansas State University. The aluminum has excellent flow characteristics; tubing will perform well at pitches as low as 35 degrees, the company states, compared to a 45-degree pitch needed for spouts made of wood or steel. This permits greater flexibility in design and layout of milling machinery. Even with the lower pitch, the smooth bore of the aluminum tube offers a better flow surface. The light weight of the metal makes erection easier, and longer lengths are possible, with fewer joints. There is no plating or coating to wear off the metal, and it is nonsparking and rustproof. **(1)**

• • •

Recording titrator. A new recording titrator, the Model D, has been developed by E. H. Sargent & Co. This is an all-purpose automatic and potentiometric titrator, with dual, motor-driven titrating assemblies, multiple direct-reading pH and millivolt ranges, and an automatic rate-sensing and adjusting system to prevent curve distortion



in slow reaction systems. The Model D can be used for all types of potentiometric titration, with either glass or metal electrode systems, in which end points are determined either from a recorded curve or by automatic interruptions of titration at a predetermined pH or voltage value. Write: Dept. RT, E. H. Sargent & Co., 4647 W. Foster ave., Chicago 30, Ill. **(2)**

• • •

Emulsifier improved. An improvement on an earlier product introduced in 1960, an all-vegetable "mono" ingredient for yeast-raised baked goods has been developed by the Food Industry Department, Atlas Powder Co.; the new product is "Atmul 651." It is said to give bakers a relaxed, extensible dough, dry and easy to work; a symmetrical loaf with straight side walls and no sagging, through "cell wall control"; greater volume or shorter proofing time, and less shrinkage in the cooling racks. It may be added at the sponge or dough stage and needs no premixing or blending with other materials. Changes in formulation or fermentation time are not necessary. **(3)**

• • •

Monoglycerides in new uses. New applications of distilled monoglycerides and distilled acetylated monoglycerides have been developed by Distillation Products Industries to produce low-calorie "fruit-fluff" and "fruit-freeze," nutritious protective food coatings, edible lubricants for processing equipment, and an edible plasticizer for plastic films used in packaging.

"Fruit-fluff" and "fruit-freeze" are high-volume food foams produced by adding 1% Myverol distilled monoglycerides to pureed fruit, then heating, and whipping or freezing the compound. Nothing else is added and the fruit foams up to 10 times its original volume. The "Fluff" can be used as a salad dressing or dessert topping; "freeze" is a frozen dessert which does not melt readily. The foaming effect is obtained from Myverol distilled monoglycerides made from saturated fats such as hydrogenated lard or hydrogenated cottonseed oil.

DPI is using another series of its products, Myvacet distilled acetylated monoglycerides, to develop a nutritious protective food coating which forms a skin-tight film when applied by either spray or dip methods. The coating, which clings tight to indentations or crevices in the product, improves life and appearance of frozen meat, fish, and poultry, as well as dried fruits, nuts, confections, and cheese, according to the announcement.

Myvacet liquid forms are well suited to use as a lubricant for food-processing equipment of metal, glass, or stone. The slight polarity of Myvacet materials orients them in tenacious films that cling to vertical sides of a tub or trough where other oils don't. They are so effective in thin films, DPI states, that transfer to finished food is low. The liquid is also useful as a plasticizer. **(4)**

• • •

Catalogs available. Bel-Art Products announce their new 1961 catalog, now ready (44 pages). It features a line of **laboratory ware** for science and industry, believed the most complete that is available from one source. The catalog describes, illustrates, and gives prices on hundreds of items in various plastics and other material. Copy

Gourmet?
No. But He Knows What He Likes! Maybe his tastes run more to pot roast than to pâté de foie gras, but he and millions like him know instinctively when a flavor is "right". It takes a lot of experimenting to find the right flavor for a certain product. It takes a good working relationship between manufacturer and flavor supplier. It takes proper testing. And experience. In Felton's case, you can count on over forty-eight years of experience with flavors. The man from Felton has one aim: to find the flavor that best suits your product, the flavor that best sells your product and keeps them asking for "seconds". Felton Chemical Company Inc. 599 Johnson Ave., Brooklyn 37, N. Y.
Felton

on request: Bel-Art Products, Industrial Road, Pequannock, N. J. **(5)**

Dodge & Olcott catalog (April 1961) lists **essential oils, aromatic chemicals, and certified colors;** 36 pages of prices, products, and brief descriptive material. For your copy, write to Dodge & Olcott, Inc., Manhattan Industrial Center, 75 9th Ave., New York 11, N. Y. **(6)**

Process Chemicals Co. presents an up-to-date catalog of **food surfactants and emulsifiers.** These include mono- and diglycerides and polyoxyethylene sorbitans of food-grade fats and oils that have been approved by FDA. Possible applications of the 24 surfactants listed include bakery, confectionery, convenience foods, and dairy products. Dry mixes, dehydrated potatoes, peanut butter, frozen eggs, and sandwich spreads are among the specialty applications. The "Food Surfactant Catalog" is available on request from Process Chemicals Co., 8733 South Dice Road, Santa Fe Springs, Calif. **(7)**

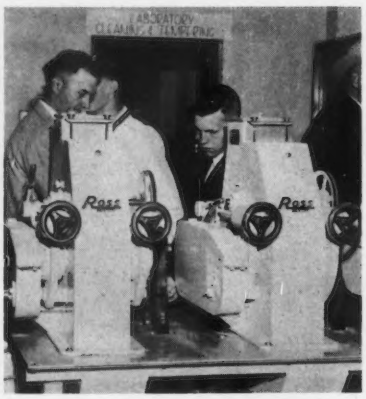
Information on Bausch & Lomb **DynaZoom laboratory microscopes,** with MicroZoom continuously variable magnification, is available from the distributors, Chicago Apparatus Co., 1735 North Ashland Ave., Chicago 22, Ill. A recent brochure, gives many details about construction and features, with illustrations of separate parts. **(8)**

E. H. Sargent & Co.'s Catalog 109 is now being distributed to scientific and purchasing personnel. It is an encyclopedia of **scientific instruments, apparatus, and chemicals,** with nearly 1,500 pages of comprehensive listings—over 38,000 items compiled in alphabetical order by the most commonly used names. Illustrations are up to date and accurate. Send requests to: Department 109, E. H. Sargent & Co., 4647 West Foster Ave., Chicago 30, Ill. **(9)**

• • • **Patter**

A new Pillsbury flour mill in East Los Angeles begins operation about July 1, The Pillsbury Co. announces; a pneumatic mill of 4,000 cwt. capacity. The contract for engineering and supply of equipment was handled by Henry Simon Ltd., England, and its affiliate in Minneapolis, The Simon-Carter Co. A team of engineers from Pillsbury spent several weeks at Simon headquarters in England, to establish close co-operation in the planning and engineering of the new mill. The 7-story remodeled structure, built originally in 1947, contains the entire milling operation from cleaned wheat to finished flour, including some of the pre-milling conditioning operations, in the space of 2,232 sq. ft. or about 4.5 sq. ft. per cwt. (average about 6 in other Pillsbury mills). Rapidly increasing population and Pillsbury's expanding business in California led to this expansion.

Cutting the ribbon to open Kansas State University's new milling technology building is John Vanier, Salina, a long-time friend and supporter of the K-State Flour and Feed Milling Industries Department. He is president of Western Star Mill Co. At right is Ellis English, Minneapolis, Minn., president of the Millers' National Federation and vp of Archer-Daniels-Midland. At left are, L to R, Steve Vesecky, vp Campbell Taggart Associated Bakeries, Inc., Dallas; R. B. Laing, Abilene Flour Mill; and William Stone, Continental Bakeries, Chicago.



Experimental mills in the laboratory of KSU's Department of Flour and Feed Milling Industries attracted the attention of high-school students who attended a "careers" day. This was part of the dedication program of the new milling technology building. Shown here are two pairs of corrugated rolls for breaks. By milling small samples, students gain an understanding of the processes which occur in the large mill.

• • •

Livestock feeders' day was observed on May 6 at Kansas State University. This 48th annual occasion was marked by reviews of experiments during the past year by members of KSU's animal husbandry staff, and an afternoon panel discussion on use of harvested forages and grass. Experiments reported included those on artificially dried corn for cattle; comparative value of four varieties of forage sorghum silage for wintering calves; and pelleting of forage sorghums.

• • •

The recent merger of Universal Foods Corp. of Chicago with Red Star Yeast & Products Co. of Milwaukee will result in expanded customer service for the Chicago company and a further step in product diversification for the yeast firm, the two managements have declared. Universal, which manufactures and distributes nationally a variety of institutional food products, becomes the Universal Foods Division of Red Star. According to a comment by D. E. Fisher, Red Star's vp-marketing, "The institutional food field is the fastest-growing segment of the food industry." The companies will jointly examine the market possibilities of new convenience foods and the expanding potential of the vending market.

• • •

The American Society of Brewing Chemists held a highly successful annual convention in San Antonio, described as one of its most interesting and informative. The large and attentive audience at the technical sessions attested to the excellence of the 21 papers arranged by the program committee under chairman Hollenbeck.

At the opening luncheon on Monday the delegates were welcomed by Harry Jersig, president of Lone Star Brewing Co., and Albert J. Range, vice-president and assistant general manager of Pearl Brewing Co. Among the speakers was Nicolas Schliefer, president of the Master Brewers' Association of America.

The past president's breakfast was held on Tuesday morning. After the technical sessions and a buffet luncheon the group toured the Aerospace Medical Center at Brooks Air Force Base. On Wednesday morning, reports of the technical subcommittees, under John Compton, were given. A business meeting followed, including a discussion on a proposed merger with M.B.A.A., and election of officers took place. On Thursday the convention was adjourned, and delegates and their wives were entertained with luncheons and plant tours of the Lone Star and Pearl breweries.

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The new officers are: Allan Dickson, president; Irwin Stone, president-elect; John B. Bockelman, vice-president; Frank R. Bawden, treasurer.

• • •

Annual Meeting and Short Course. Efforts extended by the committee for ninth annual meeting, American Association of Feed Microscopists, were well repaid with a program of outstanding quality. It included a Short Course, given for the first time in conjunction with the annual meeting. The course was under the direction of E. E. Brown of Texas A & M College, whose article on feed microscopy and the training courses appears elsewhere in these pages (p. 194). Mr. Brown's staff of instructors included head instructor Lewis Barefield, and instructors Melvin Tucker and G. M. Barnhart, plus a staff of six special instructors.

The beginners' section gave the students a basic understanding of the identifying features of plant, animal, marine, and mineral feed ingredients. Advanced courses dealt with micro-quantitative analysis and more complex analyses, and other phases of microscopy.

Feed Microscopy

FROM PAGE 194

attempting to cover all of the by-products which may go into the various feed mixtures. Each person who attends the course is supplied with small reference samples of most of the other important ingredients for later study. The table lists ingredients that are studied in considerable detail.

Special emphasis is given to specific histological characteristics which serve to identify the several tissues found in each individual plant or animal product. Lectures with slides are followed by individual study with the compound microscope. Following the study of the single ingredients, mixtures of three or more ingredients are studied, and the student attempts to identify each of the ingredients in the mixture. Advanced students on microquantitative analysis attempt to determine the kind and percentage of individual ingredients contained in special mixtures prepared for that purpose.

Ingredients Used for Detailed Study

Alfalfa
Cottonseed
Soybean
Linseed
Peanut and fish meals
Ground barley
Oats
Grain sorghum
Ear corn chop with husk
Wheat and rice bran
Corn gluten meal
Rye and wheat shorts
Brewer's grains
Tankage
Meat and bone scraps
Poultry by-product meal
Hydrolyzed feather meal
Milk by-products

What Benefit?

The benefit which each person derives from the course is dependent in some degree upon his previous training and experience with this type of work. Students with mill experience and some familiarity with the microscope and the gross and physical appearance of the ingredients studied progress more rapidly than those without this background. Students with some training in botany and histology are better able to follow the lectures and microscopic studies.

Twenty-six persons participated in the short course in 1960. Three were from the Texas feed industry and one from a Texas industrial laboratory. Twenty-two others came from Arkansas, Alabama, Colorado, Florida, Illinois, Kansas, Minnesota, Missouri, Nebraska, New Jersey, Virginia, and Mexico.

Rice Conference

FROM PAGE 192

high protein content. This procedure is used also on wheat flours and is under investigation in the Northern Utilization Research and Development Division at Peoria, Ill. The procedure segregates fractions on the basis of particle size and weight.

R. R. Mickus, chief technologist of Rice Growers Association, Sacramento, Calif., reported progress in the use of bran in feeds and of bran oil as cooking oil and in margarine. E. Beagle of Beagle Products Co., Sacramento, discussed numerous uses of rice hulls. Hulls, he said, are about 80% salable in various products. The most promising chemical products are furfural and alpha-cellulose. Products from physical modification (burning or grinding) include ash (an absorber of waste oil), pink ash (a mild abrasive in soap), chinchilla bath (to absorb oil from fur), fertilizer adjunct, and others. Untreated hulls are used in many ways, including litter material for poultry, mulch, soil conditioning, blast cleaning, and feeds, but demand is inadequate at present. More research may uncover new markets.

CLASSIFIED

SITUATIONS OPEN

National company has opening for a cereal chemist or food technologist with experience in baking technology. Position includes supervising control bake shop and conducting experimental work in field of baking. Salary commensurate with training and experience. Write to Dr. J. A. Thorn, Manager of Laboratories, Red Star Yeast and Products Co., P.O. Box 737, Milwaukee 1, Wisconsin.

Research and Quality Control in Baking process using Cracker Type Batter. Reply to: Dept. 35, CEREAL SCIENCE TODAY, 1955 University Ave., St. Paul 4, Minn.

FOR SALE

Used National Manufacturing Co. Mix-o-Graph (complete). Used Brabender Moisture Tester (complete except for thermometer). Reply to: Dept. 30, CEREAL SCIENCE TODAY, 1955 University Ave., St. Paul 4, Minn.

Brabender Rapid Pilot Mill, Type MA No. 214. If you have need for this piece of equipment, make an offer. Cereal Testing Laboratory, P.O. Box 64, Atchison, Kan.

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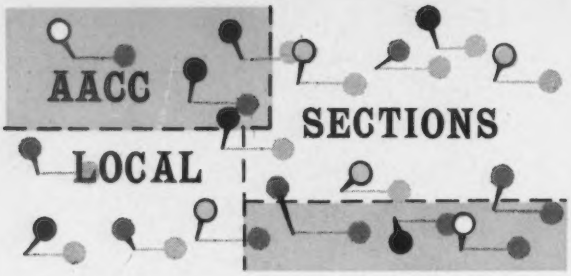

Chesapeake Section held an all-afternoon session May 25, assembling at the Agricultural Research Center at 1:15 and going on to the Wilkins-Rogers Milling Co., in Washington. Here a plant tour, arranged and conducted by L. H. Pankey of this company, demonstrated "Some problems of milling flours and compounding cake mixes, with their solutions." Those attending were shown how cereal grains are processed into flour on a commercial scale, and how cake mixes are prepared. After a business meeting, a sound film produced by the U. S. Office of Civilian Defense was shown and Mr. Pankey talked briefly about some of the problems involved in the work under discussion. Dinner at a downtown Washington restaurant followed.

Walter T. Greenaway, chairman of the Section for the coming year, recalls the programs held during the past year, with their excellent speakers, and feels that they helped the individual capture a measure of enthusiasm in his work, and often started him on a new train of thought. "I now turn this pleasure of writing" to section members, Mr. Greenaway concludes, "over to Chris Hansen, my strong right arm for the coming year and the new vice-chairman. The other officers are Doris Baker, secretary, and Haward Hunt, treasurer.

• • • •

Northern California Section met on May 24 at Spenger's Fish Grotto, Berkeley. Glenn R. Ekman, National Starch and Chemical Corporation, gave a brief discussion of the broad general types and uses of starches, with emphasis on food applications. This was followed by a more detailed discussion with demonstrations of properties and uses of some of the newer modified and pregelatinized starches. The ensuing question-and-answer period was a lively one.

It was voted to hold a joint meeting with the Southern California Section in late October or early November this year, on a trial basis, instead of the traditional spring meeting. The annual picnic comes in September (date to be announced).

Bob Burns, chairman-elect of Southern California Section, was introduced as a welcomed guest and made a few remarks concerning the joint meeting.

• • • •

Southern California Section, meeting on May 2, elected the following new officers: Bob Burns (Wallace & Tiernan), chairman; Jack Lax (Joe Lowe Corp.), vice-chairman; Joe De Haan (General Mills), secretary; Robert Molner (Capital Milling Co.), treasurer.

Arrangements for fall meetings were discussed and new committees were appointed.

• • • •

Pioneer Section held a regular meeting on June 9 and 10 at the Youngblood Hotel, Enid, Oklahoma; there was no meeting in April because of the Dallas convention.

Friday evening's gathering was informal, aside from committee meetings. Saturday's session began at 9 a.m. with a business meeting and committee reports. Vice-chairman Dale Phillips presided in Robert Hoecker's absence, and Leslie Longshore was acting secretary for Wayne Parker, whose recent eye surgery prevented his attendance.

John Giertz, chairman of the Southwest Crop Reporting Committee, had charge of a discussion of the 1961 wheat crop, but reports were limited because of recent rains throughout the area. The next meeting of this committee will be held at Municipal Airport, Wichita, Kansas.

After luncheon, trophies were awarded to members who had reported the best analyses on the monthly Pioneer Check Sample work for 1960. They were: for moisture—Robert Prockler, Nebraska Consolidated Mills, Grand Island; for ash—D. H. ("Pete") Ginn, Kansas Milling Co., Wichita; for protein—Harry Stapleton, Rodney Milling Co., McPherson, Kansas; and for maltose—Marvin Armour, International Milling Co., Salina, Kansas. The awards were presented by George Schiller, The Pillsbury Co., Enid, chairman of the Trophy Committee (see photo).

George Schiller, right, presents the trophies to (L to R) Harry Stapleton; D. H. ("Pete") Ginn; and Paul Wesley, Abilene Flour Mills, Abilene, Kansas, who represented trophy winner Marvin Armour.

A SPRINGTIME CROP — OFFICIAL REPORTS AND ACTIONS

Food Additives Transition Amendment of 1961. During 1959-60 it became evident that neither the food industries nor the Food and Drug Administration could obtain and evaluate pertinent data on some 3,000 food additives by the March 5, 1961, deadline. Many additives have been officially announced as "Generally Recognized As Safe" (GRAS); some others which had "Prior Sanction" were brought into clearer view; some substances are under pending "Petition"; others may pass by default or abandonment.

The words "food additives" have two contrasting meanings. For present purposes the author chooses to employ the expression in the long-term, and still internationally prevailing, connotation, an adjunct whether by intention or not; whether GRAS or not.

In the autumn of 1960 the FDA drafted, and recently the Congress has passed, the Bill to extend until June 30, 1964, the "Food Additives Transitional Provisions Amendment of 1961." It is Public Law 87-19 and a copy can be obtained through a Congressman, Senator, or the House Document Room.

FDA's Administrative Policy Statement. In the *Federal Register* of April 15, 1961, pages 3245-3246, the FDA has spelled out in "Definitions and Procedural Interpretative Regulations" the procedures which should now guide industries toward earliest completion of still unfinished food additives considerations. Everyone concerned should move promptly toward concluding such unresolved questions.

FDA's Food Standards Report for 1960. The Department of Health, Education, and Welfare, in its Annual Report for 1960, shows on pages 256-257 a summary of Food Standards actions by FDA for the year. Of a score or more actions, one in the field of cereal chemistry permits the addition of pepsin or papain in enriched farina to facilitate quicker cooking.

In the *Federal Register* of July 27, 1960, pages 7125-7141, No. 145, Vol. 25, the FDA promulgated standards for "Frozen Desserts; Definitions and Standards of Identity." Some features were regarded by the affected foods and packaging industries to be unreasonable and litigation is now pending in the Courts. Meanwhile other noncontroversial parts of the Order are effective.

FDA Expanding. With many increasing work-loads, FDA's personnel too is expanding substantially, if not quite at the rate recommended a few years ago by a committee headed by G. Cullen Thomas. Field Inspectors numbered under 500 in fiscal 1960, more than 600 in the year ending June 30, 1961, and the number is to be increased moderately in the year ahead. Currently FDA's budget is about $18.7 million. For the new year starting July 1 about $23.7 million is being requested. FDA personnel in Washington are scattered through five inconveniently separated buildings, but ground recently has been broken for a new FDA centralized building at 3rd and C Streets S.W. in Washington. An animal laboratory building is also projected for construction in Beltsville, Maryland, possibly close by the USDA's Research Center.

Many Other Food Regulatory and/or Advisory Actions. Lest anyone get the erroneous concept that only FDA, among the regulatory agencies, looms large in the field of foods, the writer wishes to emphasize that the Department of Agriculture, the Public Health Service, and numerous other departments or independent agencies (the Veterans' Administration to name but one) are actively concerned with foods; specifically, with food standards. Even the Treasury Department, through its Alcohol and Tobacco Tax Division, Internal Revenue Service, has announced newly rewritten standards for a long list of Alcoholic Beverages.

"Food and Color Additives Directory." Under the above title, Information for Industry, Inc., 1000 Connecticut Ave. N.W., Washington 6, D.C., has recently started a useful new service. The material is compiled by the Hazleton Laboratories, Inc., of near-by Falls Church, Virginia. The directory, in five volumes, 3,000 pages, is said to refer to 7,000 *Federal Register* actions.

It is available at $150.00 for the document through December 1960; and $150.00 for each year's continuing revision service. Neither FDA nor anyone else, to this writer's knowledge, has published a continuing information service like this.

From the numerous official publications regulating foods the most apparent common denominator is—change!

FRANK L. GUNDERSON

···INTERNATIONAL REPORTS···

• • • England

MECHANICAL DEVELOPMENT OF BREAD DOUGHS

Two reports from the British Baking Industries Research Association on aspects of the mechanical development of bread doughs have just appeared, with the subtitles "Effects of Dough Water Content" (No. 55) and "Effect of Flour Quality" (No. 56).

The essential difference between a conventional and a mechanical development process is the complete elimination of bulk dough fermentation in the latter case. This is achieved by doing intense mechanical work on the dough, and the machines at present in use for this process either deposit dough pieces into tins ready for final proof or continuously extrude dough to a conventional divider.

The most striking conclusion in Report No. 55 is that it is no longer relevant to talk about a single level of water absorption for a particular flour, as is done for conventional breadmaking. In fact, the level of water to be used with any given flour can be decided very largely by suitable adjustments to other conditions in processes where the dough is deposited directly into the tins. Where, however, conventional dividers and molders are used, the usual limits imposed by dough stickiness will apply. For example, suitable alterations to the pressure inside the development chamber and to levels of fast-acting oxidizing agent will allow successful bread production over a wide range of dough water contents.

Report No. 56 applies the findings of earlier reports to tests on flours ranging in quality from a strong Canadian bread flour to a biscuit flour. It demonstrates that by suitable adjustments of work expenditure and oxidizing treatment good bread can be produced from any normal bread flour. Though it is not of commercial importance, even a high-protein, high-ratio cake flour was shown to be capable of giving a loaf.

The level of oxidizing treatment found necessary for each flour was accurately determined by laboratory tests and the report giving details of these laboratory tests is now in course of preparation.

NEW LABORATORY WING

The new North Wing at the Research Station at Chorleywood, Hertfordshire, England, was officially opened on Thursday, April 27, 1961, by Mr. Trevor Bowen, D.L., J.P., Honorary President of Barkers of Kensington, former Master of the Worshipful Company of Bakers, and a very well known and respected figure in the British baking industry.

The facilities in the new wing have been made essential by the growth in membership and in the research work. The wing provides improved accommodation for longer-term research projects to match the accommodation provided for the shorter-term work in 1951, when the present West Wing was opened.

The two-story wing runs northward from, and is linked to, the original building of Chorleywood Lodge. It was designed to blend with the existing buildings. The main feature of the ground floor is the new pilot-scale biscuit bakery and its associated laboratory. New pieces of equipment, built especially for this bakery by members of the Research Association, are a forced-convection traveling oven by the Spooner Food Machinery Engineering Co. Ltd. and a De Vuurslag rotary biscuit cutter supplied by John Pelkman Engineering Co. Ltd. The biscuit section will thus be able to study the full range of hard- and soft-dough biscuits, and plans are now being drawn up to expand previous work and to initiate new studies with the improved equipment available.

Another new feature is the Buhler experimental mill, enabling the Research Association to mill its own samples of flour from selected wheats. This will greatly assist existing research programs concerned with the composition of the lipid and protein fractions in flours from different wheats.

The careful design of the new organic chemistry laboratory, which is mainly concerned with research on flour lipids, means increased efficiency for the enlarged staff which resulted from the award of a substantial grant from the U.S. Department of Agriculture in support of the work. A special feature is that inert gases such as nitrogen and argon are piped into the laboratory from cylinders housed in storage racks outside the building.

At the southern end of the upper story is the new microbiology laboratory, extending the width of the

The new North Wing of the British Baking Industries Research Station at Chorleywood, Hertfordshire, was officially opened on April 27, 1961. It houses a new pilot-scale biscuit bakery and associated laboratory, a cereals research section containing a Buhler experimental mill, and laboratories concerned with microbiology, organic chemistry, and physical chemistry.

building. This laboratory has separate rooms for sterilization and those operations which require a clean dust-free atmosphere. These new quarters will greatly facilitate current work in the detection and control of food-poisoning and food-spoilage organisms and identification and control of insect pests.

A combined office and laboratory is provided for the Deputy Director of Research and another for the Head of the newly formed Member Services Division. Office accommodation is also provided for the relatively new Scientific Liaison Service, the purpose of which is to promote the application of the results of scientific research in the baking industry and to assess problems in industry which require some research for their solution.

In another laboratory, the Physical Chemistry Section is working on starch and protein. It is hoped that the work on starch, a long-term investigation of changes which take place in starch gels during aging, will give information of value in solving the problem of bread staling. The work on flour proteins is also fundamental in nature, in that it is expected that a careful examination of the protein components of wheat gluten from different sources will lead to greater understanding of the meaning of the term "baking strength" and perhaps to measures for its control.

NOTE: Firms engaged in, or connected with, the baking industry in any part of the British Commonwealth are eligible to become members of the Research Association and to receive copies of all its technical literature. At the present time membership includes firms from nearly all parts of the Commonwealth and details relating to costs, etc. may be obtained on application to the Secretary, British Baking Industries Research Station, Chorleywood, Herts.

• • • Australia

Further notes on the Tenth Annual Conference, Cereal Chemistry Group of the Royal Australian Chemical Institute:

The Cereal Chemistry Group is unique within the Institute in that its only meeting is the Annual Conference. It has come to be a policy that the Conference alternate between the States of New South Wales, Victoria, and South Australia and that it be held away from the Capital City to encourage personal contact between delegates in an informal atmosphere.

This year's Conference, held at Leura in the Blue Mountain district of New South Wales, was distinguished by the attendance of J. A. Anderson, Director of the Grain Research Laboratories of Canada, who is well known to all concerned with wheat. Dr. Anderson was a guest of the Group; his visit was made possible through funds provided for the purpose by the Cereal Industries.

As usual, delegates assembled during the Monday afternoon of the Conference week—Oct. 10 to 15—and renewed acquaintance at a Buffet Dinner.

The Conference was opened on the Tuesday by W. Sloan, Chairman of the Bread Research Institute of Australia.

Under the Chairmanship of H. C. Gluskie, Director of the Weston Research Laboratories, the speakers for the first session were R. A. Bottomley of Mauri Bros. & Thomson Ltd., on "The Continuous Bread-making Process"; B. J. Brooks of Peerless Milling Co. W. A., on "Wheat Classification"; and A. C. Jennings of Adelaide University, on "The Chemistry of Grain Growth." Dr. Anderson also presented his principal paper during this session.

Between conferences the work of the Group is performed in Subcommittees. The Reports of the Subcommittees on the Cookie Test (for soft flour), on Physical Dough Testing, and on Education were received and debated, and policies for work during 1961 were formulated.

On the second day delegates traveled by car and coach to the newly completed laboratories of the Bread Research Institute and C.S.I.R.O. Wheat Research Unit at North Ryde. The Director, E. E. Bond, welcomed delegates and invited inspection of the work of the laboratories.

The guest speaker at this session was Joan Woodhill, Chief Dietitian of Newcastle General Hospital. She spoke of the role of the dietitian in the health team and the formulation of some special diets including that prescribed for celiac disease, an allergy to wheat gluten.

After a barbecue luncheon in the grounds (the Ritz Hotel's cooks being brought with the Group for that purpose), the afternoon session introduced a series of papers under the heading of "Flour Reviews."

Mr. Tracey and Dr. Lee of the Wheat Research Unit reviewed "Dough Enzymology" and "The Minor Constituents of Flour" respectively.

A free night was scheduled on return to Leura, but a group of delegates took the opportunity to hold an informal discussion on Physical Dough Testing, always a contentious matter.

The third morning saw a continuation of "Flour Reviews" with papers as follows: J. F. Williams of Wm. Arnott Ltd., "Protein Chemistry"; D. H. Simmonds of Adelaide University, "Protein Fractionation and Composition"; and B. M. Graham of Peek Frean Ltd., "Dough Physics."

The reports of the Subcommittees for Analysis, Sanitation Tests, and Test Baking were next received and a new line of work, Test Milling, was proposed in an introductory paper by Mr. Jones of W. S. Kimpton Ltd.

In the afternoon the Business Session dealt with the usual matters of correspondence, election of officers, and Group policies, while many nonmembers of the Institute took the opportunity to join a scenic tour of the District.

Thursday's proceedings closed with the official dinner at which W. D. McDonald, Chairman of the Commonwealth Banking Corporation, was guest speaker.

The final day's activity was a symposium on "Wheat Quality" at which Dr. Anderson, Mr. Bond, and Professor Watson of Sydney University were speakers. The subject was thoroughly reviewed and discussed from many angles, after which a Resolution was proposed by W. H. Wilson of Crago & Sons Ltd., who, with other members of the General Committee, had been studying problems of the availability of quality

wheats through the year. The Resolution, intended for publication among interested parties from farmers to Ministers, called for urgent action toward separation of wheat classes both at sowing and at harvest, along these lines:

1) A campaign to inform growers of the disadvantages to the industry of sowing poor baking varieties, or varieties out of their recommended zones;
2) For zones which are especially suitable for either hard or soft varieties, restriction of recommendation to one or the other class;
3) The coordination of wheat breeding on a national scale;
4) The setting up of a small expert study group comprising an economist, a soil scientist, and an agricultural scientist to survey wheat-growing areas;
5) The extension of facilities for the grading of wheats at harvesting on a quality basis.

All these measures are aimed at improving the uniformity of wheat within classes both for local and export purposes.

The resolution, after vigorous discussion, was carried and copies have been widely circulated. Since the Group seldom acts outside the more scientific boundaries of its work, the seriousness to delegates of the matters resolved will be evident.

This concluded Proceedings, but many delegates stayed to join a trip to the Jenolan Caves on the Saturday.

The Conference was attended by 123 delegates, excluding guests, and was extremely successful.

Next year's Conference will be in Victoria under the Chairmanship of R. N. Taylor of Mauri Bros. & Thomson Ltd.

R. A. BOTTOMLEY

• • • Canada

At the beginning of the year, the Canadian Wheat Board, in conjunction with the Board of Grain Commissioners, established a Technical Service and Market Research Department. It will be operated by the Canadian Wheat Board to study the raw material requirements of present and potential importers of Canadian grain and flour, co-operate with and visit scientific and technical personnel in mills, bakeries, and other processing plants in importing countries, conduct market research, and provide advice and services wherever it will be mutually advantageous to do so.

This new department is under the supervision of G. N. Irvine, who still retains his position as assistant director of the Grain Research Laboratory, where, under the direction of J. A. Anderson, all the laboratory studies and services, and training of technical personnel, will be done. Thus the close liaison that has always existed between the Board of Grain Commissioners and the Canadian Wheat Board will be continued. A. W. Alcock, formerly chemist of the Maple Leaf Milling Co., Winnipeg, has been engaged by the Canadian Wheat Board as first assistant to Dr. Irvine; he is presently engaged in helping to organize the new department, training staff for future field work abroad, and preparing texts for special series of pamphlets that will be published in several languages. A. Kubicek, formerly with the Statistics Branch of the Board of Grain Commissioners, and who is trained in economics and fluent in several languages, makes the third technical member of the staff. Other technical personnel, who will be linguists and university graduates, will be given training prior to foreign travel on the Wheat Board's work.

As Dr. Irvine will be abroad for several months each year and otherwise engaged in his new duties, I. Hlynka has added applied wheat research to his other research program as well as continuing his normal duties as assistant director of the Grain Research Laboratory. T. R. Aitken has been made responsible for training the new department's technical staff; he supervises the routine milling, baking, and related studies previously done by Dr. Irvine, and coordinates the laboratory work required by the new department with that of the various sections of the Grain Research Laboratory.

T. R. AITKEN

THE BAKING INDUSTRY SANITATION STANDARDS COMMITTEE

At the Dallas convention, Robert S. Taggart, Chairman of the Baking Industry Sanitation Standards Committee, observed that few AACC members attending the convention had any knowledge of the work of the Committee. The following concise description is presented here to familiarize members with the work and goals of the organization.

The B.I.S.S.C. is an intra-industry unit formed to promote sanitation in the baking industry through the development, approval, and publication of sanitation procedures and standards for bakery machinery and equipment. The Committee receives advisory assistance from such agencies as the American Public Health Association, International Association of Milk and Food Sanitarians, National Association of Sanitarians, U.S. Food and Drug Administration, U.S. Public Health Service, and others.

If a sanitation problem becomes apparent, or when it is necessary to establish standards, the matter is taken up at a Committee meeting. If need for definite action is indicated, a special Task Committee is appointed, which investigates the problem and presents a proposed standard. This standard is reviewed, and modified, if necessary, by consultants, equipment manufacturers' representatives, and others interested. After agreement is reached, the standard is adopted by the B.I.S.S.C. and it is distributed in booklet form to participating associations and to official and quasi-official food inspection agencies.

The B.I.S.S.C. Task Committee has the ultimate aim "to develop standards which will ensure that all parts of bakery equipment are readily accessible for easy, thorough cleaning by ordinary methods by regular employees."

THOMAS MCCORMACK

PREVIEWS from CEREAL CHEMISTRY

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Gas Plasma Irradiation of Rice. I. Hydration Characteristics. A. S. Roseman, J. T. Hogan, Southern Regional Research Laboratory, New Orleans 19, La.; R. B. Stone, J. C. Webb, USDA, Agr. Engineering Laboratory, Univ. of Tennessee, Knoxville, Tenn.

A Lipoprotein Model of Wheat Gluten Structure. J. C. Grosskreutz, Midwest Research Institute, Kansas City, Mo.

Protein Granules of Maize Endosperm Cells. Donald N. Duvick, Pioneer Hi-Bred Corn Co., Johnston, Iowa

Electrophoretic Composition and Intrinsic Viscosity of Glutens from Different Varieties of Wheat. J. E. Cluskey, N. W. Taylor, Northern Regional Research Laboratory, Peoria, Ill.; Helen Charley, School of Home Economics, Oregon State College; and F. R. Senti, NRRL, Peoria, Ill.

The Bromate Reaction in Dough. IV. Effect of Reducing Agents. W. Bushuk and I. Hlynka, Grain Research Laboratory, Winnipeg 2, Manitoba.

The Bromate Reaction in Dough. V. Effect of Flour Components and Some Related Compounds. W. Bushuk and I. Hlynka, Grain Research Laboratory, Winnipeg 2, Manitoba.

The Formation of Cracks in Rice during Wetting and Its Effect on the Cooking Characteristics of the Cereal. H. S. R. Desikachar and V. Subrahmanyan, Central Food Technological Research Institute, Mysore, India

Microtests for Flour Quality. H. R. Elling and M. A. Barmore, U.S. Department of Agriculture, Pullman, Wash.

Conversion of Constant-Flour Farinograph Absorption to Constant-Dough Basis. I. Hlynka, F. D. Kuzina, Grain Research Laboratory, Winnipeg 2, Manitoba; and W. C. Shuey, General Mills, Inc., Minneapolis, Minn.

Effect of Balancing on Flour as Measured by Structural Relaxation of Dough. Endel J. Jaska, The Pillsbury Co., Minneapolis, Minn.

Hardness and Moisture Content of Wheat Kernels. R. Katz, N. D. Collins, and A. B. Cardwell, Kansas Agricultural Experiment Station, Manhattan

Note on Variations in Residual Bran in Individual Rice Grains from Batches Polished to Different Degrees. A. N. Srirangarajan, H. S. R. Desikachar, K. Indiramma, and A. N. Sanakran, Central Food Technological Research Institute, Mysore, India

New AACC Members

The Officers and Directors of the AACC

extend a cordial welcome to the following individuals who have recently joined the AACC

HAMMES, PAUL A., *Cereal Products Manager* (Merck and Company), 1886 Lamberts Mill Rd., Westfield, N. J.

HOLBROOK, GENE W., *Chemist,* Lexington Mill & Elevator Co., P. O. Box 568, Lexington, Nebraska.

HOUSTON, PAUL S., *Chemist* (DCA Food Industries), 2901 Alden Rd., Baltimore 14, Md.

JANICK, WILLIAM M. (Arnold Bakers), 49 Barton Place, Port Chester, N. Y.

KECK, MARVIN C. (Kansas State University), 1626 Laramie, Manhattan, Kansas.

LINKO, YU-YEN CHENG, Dept. of Flour & Feed Milling Industries, Kansas State University, Manhattan, Kansas.

MCMILLEN, H. ELDRED (General Mills), 10300 W. Lakeview Drive, Minneapolis 26, Minn.

MERCHANT, GORDON L., c/o Merck and Co., Inc., 340 Shaw Rd., South San Francisco, Calif.

MOCK, CHARLES T., *Manager,* Institutional Formulation Lab., The Pillsbury Company, 1525 E. Phillips, Springfield, Ill.

MULLER-THYM, HAROLD TOY, Perryville, Maryland.

OBIAS, ENRICO D., Liberty Flour Mills, Inc., 528 F. Blumentritt Ext., Mandaluyong, Rizal, Philippines.

OWADES, JOSEPH L., *Director of Research* (Liebmann Breweries), 36 Forrest St., Brooklyn 6, New York.

RAPAPORT, ROBERT M. *President* (Food Products Corp.), 4607 Homestead, Shawnee, Mission, Kansas.

RIST, CARL E., *Chief, Cereal Products Lab.,* Northern Utilization Research & Development Division, 1815 No. University St., Peoria, Illinois.

VALIENTE, ANA, Molinos de El Salvador, S.A., Ap. 327, San Salvador, El Salvador.

Modern Insecticides and World Food Production, by F. A. Gunther and L. R. Jeppson; 284 pp. John Wiley and Sons, Inc., New York, N. Y., 1960. Price $8.50. Reviewed by WARREN O. EDMONDS, Agricultural Wildlife Industries, Parkville, Mo.

This book is so written and illustrated that the layman can understand the fundamentals of economic entomology. It is also an invaluable addition to the library of the specialist. Since the text as written is of a summary nature and covers the broad scope of insecticides, each chapter is authenticated with valuable references.

Sixteen chapters, followed by an appendix and a subject index, compose the book. The first two chapters concern the insect and its host and methods of control. Chapters 3, 4, 5, and 6 explain the modern insecticide, its effectiveness, formulation, application, deposits, and residues. Chapter 6 specifically concerns deposits and residues, and part of the chapter deals with Public Law 518 (the Miller Amendment). The chapter impresses the reader with the vast amount of work and expense necessary to put a new pesticide into commercial use.

Chapter 7 presents the various aspects and theories of insect resistance. The basic history of DDT-resistant insects and the growing resistance of certain insects to the newer organic phosphate insecticides and acaricides is discussed at length. Chapter 8, titled "Acaricidal Compounds," defines the acaricide, explaining in detail the more common acaricides in use today.

Chapters 9 through 16 deal with the various chemical types of insecticides and their composition. Starting with the Organochlorine (chlorinated hydrocarbon) compounds, organophosphorus, petroleum, botanical, fumigant, soil-treatment, and other insecticical compounds follow. Chapter 16 explains attractant and repellant compounds. A review of this chapter reveals the tremendous possibilities that exist in this type of insect control.

The appendix is divided into three sections. Appendix A lists approximate mammalian toxicities of the pesticides mentioned in the book; Appendix B, the originators and sources of some of the modern pesticides; and Appendix C, the common and scientific names of pests mentioned in the text.

INVITATION FOR PAPERS TO BE PRESENTED AT THE 47th ANNUAL MEETING, ST. LOUIS, MAY 20-24, 1962

Members of the AACC are invited to present original scientific papers at the 47th Annual Meeting. The broad scope of the program is now firming up, and you should contact any of the Session Chairmen listed below if you think that you will have a paper to present.

Fats and Oils: Mr. John B. Woerfel, Armour & Co., Box 9222, Chicago 90, Ill.

Feed: Mr. Waldon H. Hastings, Dept. of Flour and Feed Milling Industries, Kansas State Univ., Manhattan

Flour: Miss Doris Baker, USDA, AMS, Agr. Research Center, Beltsville, Md.

Food Additives: Dr. Virdell E. Munsey, Food & Drug Administration, 12th and C Sts. SW, Washington 25, D.C.

Milk Powder and Proteins: Mr. Charles A. Becker, Sheffield Chemical Co., Norwich, N.Y.

Practical Lab Techniques: Mr. Robert B. Kilborn, The Wheatena Corp., Highspire, Pa.

Pre-Milling Treatment of Wheat: Mr. Paul J. Mattern, Dept. of Agronomy, Coll. of Agr., Lincoln 3, Nebr.

Applications and Properties of Soybean Products: Mr. Dale W. Johnson, 1825 N. Laramie Ave., Chicago 39, Ill.

Starch: Dr. Thomas J. Schoch, Corn Products Co., Box 345, Argo, Ill.

Wheat Proteins: Dr. Walter Bushuk, 190 Grain Exchange Bldg., Winnipeg 2, Manitoba

Yeast and Baking: Dr. R. D. Seeley, Anheuser-Busch Inc., 721 Pestalozzi St., St. Louis 18, Mo.

KENTON L. HARRIS
General Chairman,
Program Committee

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